WHAT IS CLAIMED IS:

1. A process of designing a mask for use in a photolithographic process to form a predetermined feature on a substrate using a process light intensity, the process comprising steps of:

a) defining a mask for use in the photolithographic process, wherein the mask has at least one boundary matching a boundary of the feature;

b) identifying a location of the process light intensity relative to the mask boundary;

c) segmenting the mask boundary into a plurality of regions, each region having a midpoint;

d) calculating a distance Δ normal to the boundary in each region between the respective region midpoint and the location of the process light intensity;

e) identifying if a close connection exists relative to the respective region; and

f) for each region, moving the region a distance Δ' based on the distance Δ calculated in step (d) and the identification in step (e).

2. The process of claim 1, wherein step (f) includes, for each region, steps of:

f1) moving the mask boundary within the region by Δ if a close connection is not found to exist at step (e), and

f2) moving the mask boundary within the region by $\Delta/(1+P)$ if a close connection is found to exist at step (e).

3. The process of claim 1, further including steps of:

g) defining a plurality of local images of mask boundaries, each local image having a function,

h) defining a plurality of classes of local images having similar function sets,

i) identifying a function associated with a selected local image,

j) comparing the function of the selected local image to the function set of a class of local images, and

k) assigning the selected local image to a class based on the results of step (j).

4. The process of claim 3, wherein step (i) is performed by:

i1) decomposing a selected local image into a set of oriented segments defining a function,

and wherein step (j) is performed by:

j1) computing a difference between the selected local image function and a function of a local image of a class.

5. The process of claim 3, further including steps of:

l) defining a plurality of first pattern points along a first axis normal to a boundary of the mask defining the feature,

m) calculating a diffusion shift of a photoresist based on a process light intensity at each pattern point, and

n) shifting the boundary of the mask a distance along the first axis based on the diffusion shift.

6. The process of claim 5, further including the step:

o) defining a plurality of second pattern points along a second axis parallel to the boundary,

and wherein step (m) includes steps of:

m1) calculating first and second subsidiary values based on the light intensities at each pattern point, and

m2) calculating the diffusion shift based on the first and second subsidiary values.

7. The process of claim 1, further including steps of:

l) defining a plurality of first pattern points along a first axis normal to a boundary of the mask defining the feature,

m) calculating a diffusion shift of a photoresist based on a process light intensity at each pattern point, and

n) shifting the boundary of the mask a distance along the first axis based on the diffusion shift.

8. The process of claim 7, further including the step:

o) defining a plurality of second pattern points along a second axis parallel to the boundary,

and wherein step (m) includes steps of:

m1) calculating first and second subsidiary values based on the light intensities at each pattern point, and

m2) calculating the diffusion shift based on the first and second subsidiary values.

9. A process of designing a mask for use in a photolithographic process to form a predetermined

feature on a substrate, the process comprising steps of:

a) defining a mask for use in the photolithographic process, wherein the mask has at least one boundary matching a boundary of the feature;

b) defining a plurality of local images of mask boundaries, each local image having a function;

c) defining a plurality of classes of local images having similar function sets;

d) identifying a function associated with a selected local image;

e) comparing the function of the selected local image to the function set of a class of local images; and

f) assigning the selected local image to a class based on the results of step (e).

10. The process of claim 9, wherein step (f) is performed by:

f1) assigning the selected local image to a class having the most similar function to the selected local image if the similarity meets a predetermined threshold; and

f2) creating a new class centered on the selected local image if the similarity

does not meet the predetermined threshold.

11. The process of claim 9, wherein step (d) is performed by:

d1) decomposing a selected local image into a set of oriented segments defining a function,

and wherein step (e) is performed by:

e1) computing a difference between the selected local image function and a function of a local image of a class.

12. The process of claim 9, further including steps of:

g) correcting the boundary of one local image of each class, and

h) applying the corrections of step (g) to all other local images of the class.

13. The process claim 9, further including steps of:

i) defining a plurality of first pattern points along a first axis normal to a boundary of the mask defining the feature,

j) calculating a diffusion shift of a photoresist based on a process light intensity at each pattern point, and

k) shifting the boundary of the mask a distance along the first axis based on the diffusion shift.

14. The process of claim 13, further including the step:

l) defining a plurality of second pattern points along a second axis parallel to the boundary,

and wherein step (j) includes steps of:

j1) calculating first and second subsidiary values based on the light intensities at each pattern point, and

j2) calculating the diffusion shift based on the first and second subsidiary values.

15. A process of designing a mask for use in a photolithographic process to form a predetermined pattern in a photoresist on a substrate using a process light intensity, the pattern representing a feature being formed on the substrate, the process comprising steps of:

a) defining a plurality of first pattern points along a first axis normal to a boundary of the mask defining the feature;

b) calculating a diffusion shift of a photoresist based on a process light intensity at each pattern point; and

c) shifting the boundary of the mask a distance along the first axis based on the diffusion shift.

16. The process of claim 15, further including the step:

d) defining a plurality of second pattern points along a second axis parallel to the boundary,

and wherein step (b) includes steps of:

b1) calculating first and second subsidiary values based on the light intensities at each pattern point, and

b2) calculating the diffusion shift based on the first and second subsidiary values.

17. The process of claim 15, further including the step of:

d) defining a plurality of second pattern points along a second axis parallel to the boundary,

and wherein step (b) includes steps of:

b1) calculating a first subsidiary value, z_x, based on weighted averages and weighted differences of the light

intensities at each of the first plurality of pattern points,

b2) calculating a second subsidiary value, z_y, based on weighted averages and weighted differences of the light intensities at each of the second plurality of pattern points, and

b3) calculating the diffusion shift based on the first and second subsidiary values and a parameter of diffusion, S_{dif}, associated with the photoresist.

18. The process of claim 17, further including steps of:

e) identifying a distance, d_x, between first pattern points and a distance, d_y, between second pattern points,

f) calculating a value, z_x^G, based on z_x,

and wherein step (b3) includes:

b3a) calculating S_{dif} based on a first relationship of $d_x z_y$ if $d_y z_y > 3S_{dif}$ and $d_x z_x^G > 3S_{dif}$,

b3b) calculating S_{dif} based on a second relationship of $d_x z_y$ if $d_y z_y > 3S_{dif}$ and $d_x z_x^G < 3S_{dif}$,

b3c) calculating S_{dif} based on a third relationship of $d_x z_y$ if $d_y z_y < 3S_{dif}$ and $d_x z_x^G > 3S_{dif}$, and

b3d) calculating S_{dif} based on a fourth relationship of $d_x z_y$ if $d_y z_y < 3S_{dif}$ and $d_x z_x^G < 3S_{dif}$.

19. A computer useable medium having a computer readable program embodied therein for addressing data to cause a computer to design a mask for use in a photolithographic process to form a predetermined feature on a substrate using a process light intensity, the computer readable program in the computer useable medium comprising:

first computer readable program code for causing the computer to define a mask for use in the photolithographic process, wherein the definition of the mask includes a definition of at least one boundary matching a boundary of the feature;

second computer readable program code for causing the computer to identify a definition of a location of the process light intensity relative to the definition of the mask boundary;

third computer readable program code for causing the computer to segment the definition of the mask boundary into a plurality of regions, with each region having a defined midpoint;

fourth computer readable program code for causing the computer to calculate a distance Δ normal to the definition of the boundary in each region between the definitions of the respective region midpoint and the location of the process light intensity;

fifth computer readable program code for causing the computer to identify if the definition of the mask includes a close connection exists relative to the respective region; and

sixth computer readable program code for causing the computer to move the definition of the respective region a distance Δ' based on the distance Δ and the identification of any close connection.

20. The computer useable medium of claim 19, wherein the sixth computer readable program code includes:

seventh computer readable program code for causing the computer to move the mask boundary within the region by Δ if a close connection is not found to exist, and

eighth computer readable program code for causing the computer to move the mask boundary within the region by $\Delta/(1+P)$ if a close connection is found to exist.

21. A computer useable medium having a computer readable program embodied therein for addressing data

to cause a computer to design a mask for use in a photolithographic process to form a predetermined feature on a substrate, the computer readable program in the computer useable medium comprising:

first computer readable program code for causing the computer to define a mask for use in the photolithographic process, wherein the mask definition includes a definition of at least one boundary matching a boundary of the feature;

second computer readable program code for causing the computer to define a plurality of local images of mask boundaries, each local image having a functional definition;

third computer readable program code for causing the computer to define a plurality of classes containing definitions of local images having similar functional sets;

fourth computer readable program code for causing the computer to identify a functional definition associated with a selected local image;

fifth computer readable program code for causing the computer to compare the functional definition of the selected local image to the functional set of a class of local images; and

sixth computer readable program code for causing the computer to assign the definition of the selected local image to a class based on a similarity of the functional definition of the selected local image to the functional set of the class.

22. The computer useable medium of claim 21, wherein the sixth computer readable code includes:

seventh computer readable program code for causing the computer to assign the definition of the selected local image to the class having the most similar functional definition to that of the selected local image if the similarity meets a predetermined threshold; and

eighth computer readable program code for causing the computer to create a new class having a functional definition based on that of the selected local image if the similarity does not meet the predetermined threshold.

23. The process of claim 21, wherein the fourth computer readable program code includes:

ninth computer readable program code for causing the computer to decompose the definition of the selected local image into a set of oriented segments defining a function,

and wherein the fifth computer readable program code includes:

eleventh computer readable program code for causing the computer to compute a difference between the function of the selected local image and a function of a local image of a class.

24. The computer useable medium of claim 21, further including:

twelfth computer readable program code for causing the computer to correct the boundary definition of one local image of each class, and

thirteenth computer readable program code for causing the computer to applying the corrected boundary definitions to all other local images of the class.

25. A computer useable medium having a computer readable program embodied therein for addressing data to cause a computer to design a mask for use in a photolithographic process to form a predetermined pattern in a photoresist on a substrate using a process light intensity, the pattern representing a feature being formed on the substrate, the computer readable program in the computer useable medium comprising:

first computer readable program code for causing the computer to define a plurality of first pattern points along a first axis normal to a definition of a boundary of the mask defining the feature;

second computer readable program code for causing the computer to calculate a diffusion shift of the photoresist based on the light intensities at each pattern point; and

third computer readable program code for causing the computer to shift the definition of the boundary

a distance along the first axis based on the diffusion shift.

26. The computer useable medium of claim 25, further including:

fourth computer readable program code for causing the computer to define a plurality of second pattern points along a second axis parallel to the boundary definition,

and wherein the second computer readable program code includes:

fifth computer readable program code for causing the computer to calculate first and second subsidiary values based on the light intensities at each pattern point, and

sixth computer readable program code for causing the computer to calculate the diffusion shift based on the first and second subsidiary values.

27. The computer readable medium of claim 25, further:

fourth computer readable program code for causing the computer to define a plurality of second pattern points along a second axis parallel to the boundary definition,

and wherein the second computer readable program code includes:

fifth computer readable program code for causing the computer to calculate a first subsidiary value,

z_x, based on weighted averages and weighted differences of the light intensities at each of the first plurality of pattern points,

sixth computer readable program code for causing the computer to calculate a second subsidiary value, z_y, based on weighted averages and weighted differences of the light intensities at each of the second plurality of pattern points, and

seventh computer readable program code for causing the computer to calculate the diffusion shift based on the first and second subsidiary values and a parameter of diffusion, S_{dif}, associated with the photoresist.

28. The computer useable medium of claim 27, wherein the computer readable program further includes:

eighth computer readable program code for causing the computer to define a distance, d_x, between first pattern points and a distance, d_y, between second pattern points,

ninth computer readable program code for causing the computer to calculate a value, z_x^G, based on z_x,

and wherein the seventh computer readable program code includes:

computer readable program code for causing the computer to calculate S_{dif} based on a first relationship of $d_x z_y$ if $d_y z_y > 3S_{dif}$ and $d_x z_x^G > 3S_{dif}$,

computer readable program code for causing the computer to calculate S_{dif} based on a second relationship of $d_x z_y$ if $d_y z_y > 3S_{dif}$ and $d_x z_x^G < 3S_{dif}$,

computer readable program code for causing the computer to calculate S_{dif} based on a third relationship of $d_x z_y$ if $d_y z_y < 3S_{dif}$ and $d_x z_x^G > 3S_{dif}$, and

computer readable program code for causing the computer to calculate S_{dif} based on a fourth relationship of $d_x z_y$ if $d_y z_y < 3S_{dif}$ and $d_x z_x^G < 3S_{dif}$.